

Remarks/Arguments:

Claims 21-32 remain in this application.

Claim 21, which had been indicated to be allowable, has been amended to eliminate an indefinite antecedent basis in each of lines 1 and 12.

Claim 22 has been amended to emphasize the Helmholtz resonance function by reciting the periodic acoustical signal to have a predetermined driving frequency and the Helmholtz resonator being tuned to the predetermined driving frequency; Claims 23-25 have been amended to depend from Claim 22 as originally intended rather than from cancelled Claim 1 as inadvertently recited; Claim 24 has been additionally amended to recite an additional step of applying a sequence of periodic acoustic signals at different driving frequencies into said input volume and physically adjusting said tuning port to tune the Helmholtz resonator to each of said different driving frequencies to thereby subject the test subject to an amplified periodic acoustic field in said test volume at each of said different driving frequencies; Claim 26 has been amended in similar fashion to Claim 22 by reciting the periodic acoustical signal to have a particular frequency and the Helmholtz resonator being tuned to the particular frequency; and Claim 27, which depends from Claim 26, has been amended in similar fashion to Claim 24 by specifying the acoustical energy source to be capable of providing a periodic acoustical signal at each of different particular frequencies and the Helmholtz resonator being physically tunable to each of the different particular frequencies, to thereby subject the test subject to a high intensity acoustical field at each of the different particular frequencies. Claim 31 has been amended to eliminate an indefinite antecedent basis in line 2. Claims 21-32 as amended herein are believed to patentably define over the prior art of record. Accordingly, reconsideration is requested since none of the prior art discloses the present invention.

The Examiner's rejection of Claims 22-32 in this application based upon the Schuman patent is respectfully traversed.

Claim 22 patentably defines over the Schuman patent relied upon by the Examiner in the prior art rejection, in setting forth a method for subjecting a test subject to an acoustical field including the steps of supplying a chamber encompassing an input volume, supplying another chamber encompassing a test volume, interconnecting the chambers with a tuning port which forms a Helmholtz resonator interconnecting the input volume to the test volume, positioning a test subject within the test volume, and applying a periodic acoustical signal at a predetermined driving frequency into the input volume which is coupled to the test volume through the tuning port which forms the Helmholtz resonator tuned to the predetermined driving frequency of the periodic acoustic signal whereby a test subject in the test volume is subjected to a resonance amplified periodic acoustic field while the test volume is isolated from the acoustic energy source.

An object of method Claim 22 is to produce a high-intensity, high purity periodic-waveform acoustic field in a test volume by introducing predetermined driving frequency

acoustic energy from an acoustic energy source into an input volume that is in turn connected to the test volume by a tuning port. The test volume, input volume, and tuning port collectively form a two-volume Helmholtz resonator that is tuned to the predetermined driving frequency of the acoustic energy source (most practically by altering the geometry of the tuning port). This use of a 2-chamber Helmholtz resonator maximizes the intensity and spectral purity of the acoustic signal in the test volume, while additionally isolating the test subject from the acoustic energy source, thereby substantially eliminating energy source induced contaminative effects on the test results.

Schuman describes a system intended to enable detection of openings to or other access to one or more rooms or protected volumes ((42) and (43) in Fig. 6, column 14, line 1-column 15, line 46.) This is done by generating a low intensity, very low-frequency pressure variation in (42) and (43) using a fan or other means and using pressure sensors ((21) and (46) in Fig. 6) and a phase-sensitive signal processing technique using a synchronous rectifier to detect changes in the amplitude of this pressure variation caused by volume changes, door openings, etc. At best, Schuman discloses a two-room system interconnected by a conventional duct, which is only superficially similar to that disclosed by applicant, but the actual functions of the elements and the systems as a whole are entirely different. Schuman does not disclose or teach the use of a Helmholtz resonator and does not disclose or teach any intent, requirement or method to tune the two-room system (see Fig. 6 consisting of (42), (43) and fan duct (45)) to the predetermined driving frequency as set forth in Claim 22. Schuman fails to employ Helmholtz resonance and, accordingly, fails to subject the test subject to a resonance-amplified, high-intensity induced acoustic field. Schuman does not achieve a resonance-amplification effect and does not achieve the isolation of the test subject from the source. Schuman does discuss extensively the need to "tune" the pressure sensor and detection system to reliably detect the induced pressure variations in the two rooms—a very different issue and irrelevant to the Helmholtz resonator being tuned to the predetermined frequency of the acoustic signal as recited in the Claim 22. Accordingly, Claim 22 is considered patentable over the Schuman patent.

Claims 23-25 depend from Claim 22 and are patentable over the prior art for the reasons given in support of the patentability of Claim 22 as well as for the additional limitations recited therein. Claim 23 includes the step of exhausting air from the input volume through a high acoustical mass unit, which is advantageous in providing ventilation for the elimination of air flow produced by the acoustic energy source to thereby substantially preclude such air flow from the chamber encompassing the test volume. Claim 24 includes the steps of applying a sequence of periodic acoustical signals at different driving frequencies into the input volume and physically adjusting the tuning port to tune the Helmholtz resonator to each of the different driving frequencies. Claim 25 recites the acoustic energy source to provide a source flow of one of air and gas and modulates the source flow.

Claim 26 patentably defines over the Schuman patent relied upon by the Examiner in the prior art rejection in setting forth an acoustical test cell apparatus for subjecting a test subject to an acoustical field including a chamber encompassing an input volume, another

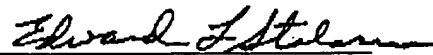
chamber encompassing a test volume, and a tuning port interconnecting the chambers to form a Helmholtz resonator interconnecting the input volume to the test volume and being tuned to resonate at a particular frequency, and an acoustic energy source for providing a periodic acoustical signal at the particular frequency into the input volume whereby a test subject in the test volume is subjected to a resonance amplified periodic acoustic field at the particular frequency while the test volume is isolated from the acoustic energy source.

Claims 26 is patentable over the prior art for the reasons given in support of the patentability of Claim 22. Schuman does not disclose or teach the use of a Helmholtz resonator and does not disclose or teach any Helmholtz resonance tuning to the particular frequency of the periodic acoustical signal provided by the acoustical energy source as set forth in Claim 26. Schuman fails to employ Helmholtz resonance and, accordingly, fails to subject the test subject to a resonance-amplified, high-intensity induced acoustic field, and does not achieve the isolation of the test subject from the source as recited in Claim 26.

Claims 27-32 depend from Claim 26 and are patentable over the prior art for the reasons given in support of the patentability of Claim 26 as well as for the additional limitations recited therein. Claim 27 recites the acoustical energy source to be capable of providing a periodic acoustical signal at different particular frequencies and the Helmholtz resonator is physically tunable to each different frequencies; Claim 28 specifies the tuning port to have a variable geometry; Claim 29 includes an exhaust means having a high acoustic mass at an outlet of the chamber encompassing the input volume; Claim 30 recites the exhaust means to be an elongated small-aperture duct; Claim 31 recites the acoustic energy source to provide a compressed air flow and includes a flow modulator for regulating the flow into the input volume; and Claim 32 includes the another chamber to include a low-volume positive-pressure ventilating air input having a high acoustic mass.

Accordingly, Claims 22-32 are believed allowable over the Schuman patent and an early notice to such effect is solicited. By this Amendment, which represents an earnest effort to conform with the requirements of 37 CFR 1.116, Claims 21-32 are believed to be placed in condition for allowance without raising new issues and without requiring a new examination, or at least in better form for purposes of appeal by reducing the issues on appeal, and entry thereof and an early notice to such effect is solicited.

May 19, 2006



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